Contents

Pretace	XVII
Acknowledgements	xix
Plan of the book	xxi
Part One Innovation management	1
1 Innovation management: an introduction	2
The importance of innovation	4
The study of innovation	7
Two traditions of innovation studies: Europe and the USA	9
Recent and contemporary studies	10
The need to view innovation in an organisational context	10
Individuals in the innovation process	12
Problems of definition and vocabulary	12
Entrepreneurship	13
Design	13
Innovation and invention	15
Successful and unsuccessful innovations	16
Different types of innovation	16
Technology and science	18
Popular views of innovation	20
Models of innovation	21
Serendipity	21
Linear models	22
Simultaneous coupling model	23
Architectural innovation	23
Interactive model	24
Innovation life cycle and dominant designs	25
Open innovation and the need to share and exchange knowledge	
(network models)	26
Doing, using and interacting (DUI) mode of innovation	27
Discontinuous innovation – step changes	28
Innovation as a management process	30
A framework for the management of innovation	30
New skills	33
Innovation and new product development	34
Case study: How Airpods helped Apple's wearables division becom	
the third largest within the company	35

	Chapter summary	40
	Discussion questions	41
	Key words and phrases	41
	References	41
	Further reading	46
2	National systems of innovation and entrepreneurship	48
	Innovation in its wider context	50
	The role of the state and national 'systems' of innovation	52
	Why firms depend on the state for so much	52
	How national states can facilitate innovation	53
	National scientific capacity and R&D offshoring	56
	The impact of the economic crisis on innovation	56
	Fostering innovation in the United States and Japan	56
	Triple Helix of university-industry-government relationships	
	that drives innovation	57
	The right business environment is key to innovation	59
	Waves of innovation and growth: historical overview	59
	Fostering innovation in 'late-industrialising' countries	62
	Innovation within the European Union states	63
	Entrepreneurship	65
	Entrepreneurship and innovation	66
	Defining entrepreneurship	68
	Technological entrepreneurship: a question of context	70
	Science and technology policy	71
	Small and medium-sized enterprise	71
	Innovation policy	72
	Entrepreneurship policy	73
	Case study: How Israel became water self-sufficient with	
	advanced technology	73
	Chapter summary	76
	Discussion questions	76
	Key words and phrases	76
	Websites worth visiting	76
	References	77
	Further reading	79
3	Public sector innovation	80
	The importance of the public sector	82
	What is public sector innovation (PSI) and why do we need it?	83
	Is there really innovation in government?	84
	Information systems, e-government and digital government	85
	Social media	86
	Differences between private and public sector innovation	87

		Contents
	A typology of public sector innovations	89
	Innovation process	91
	Innovation, public entrepreneurship and governance paradigms	94
	The output: Public value	95
	Case study: People's innovation - Parkrun	96
	Chapter summary	99
	Discussion questions	99
	Key words and phrases	100
	References	100
	Further reading	102
4	Managing innovation within firms	104
	Organisations and innovation	106
	The dilemma of innovation management	106
	Innovation dilemma in low technology sectors	107
	Dynamic capabilities	108
	Managing uncertainty	108
	Pearson's uncertainty map	109
	Applying the uncertainty map in practice	111
	Managing innovation projects	112
	Organisational characteristics that facilitate the innovation process	114
	Growth orientation	117
	Organisational heritage and innovation experience	118
	Vigilance and external links	118
	Commitment to technology and R&D intensity	118
	Acceptance of risks	119
	Cross-functional cooperation and coordination within organisational structure	119
	Receptivity	119
	Space for creativity	119
	Strategy towards innovation	120
	Diverse range of skills	120
	Industrial firms are different: a classification	121
	Organisational structures and innovation	123
	Formalisation	124
	Complexity	125
	Centralisation	125
	Organisational size	125
	The role of the individual in the innovation process	125
	IT systems and their impact on innovation	126
	Management tools for innovation	129
	Innovation management tools and techniques	130
	Applying the tools and guidelines	132
	Innovation audit	133
	Case study: Gore-Tex® and W.L. Gore & Associates: an innovative company	
	and a contemporary culture	134

	Chapter summary	138
	Discussion questions	138
	Key words and phrases	139
	References	139
	Further reading	141
5	Operations and process innovation	142
	Operations management	144
	The nature of design and innovation in the context of operations	145
	Design requirements	146
	Design and volumes	148 151
	Craft-based products	151
	Design simplification	151
	Reverse engineering	152
	Process design	154
	Process design and innovation	156
	The relationship between product and process innovation	156
	Managing the manufacturing: R&D interface in process industries Stretch: how innovation continues once investment is made	157
	Innovation in the management of the operations process	157
	Triggers for innovation	157
	Design of the organisation and its suppliers: supply chain management	162
	Business process re-engineering (BPR)	165
	Lean innovation	166
	Case study: Innovation on the production line	168
	Chapter summary	171
	Discussion questions	172
	Key words and phrases	172
	References	172
	Further reading	174
		475
	Part Two Turning technology into business	175
6	Managing intellectual property	176
	Intellectual property	178
	Trade secrets	180
	An introduction to patents	181
	Novelty	182
	Inventive step	182
	Industrial applications	183
	Exclusions from patents	183
	The patenting of life	183
	The configuration of a patent	185
	Patent harmonisation: first to file and first to invent	185

	Some famous patent cases	186
	Patents in practice	187
	Expiry of a patent and patent extensions	188
	Patent extensions	189
	The use of patents in innovation management	190
	Patent trolls	190
	Do patents hinder or encourage innovation?	191
	Alternatives to patenting	192
	Trademarks	194
	Satisfy the requirements of section 1(1)	195
	Be distinctive	196
	Not be deceptive	196
	Not cause confusion	197
	Brand names	197
	Using brands to protect intellectual property	197
	Exploiting new opportunities	198
	Brands, trademarks and the internet	199
	Duration of registration, infringement and passing off	199
	Registered designs	200
		201
	Copyright Personal agrainst infringement	203
	Remedy against infringement	203
	Damages	203
	Injunction	203
	Accounts	203
	Counterfeit goods and IP	200
	Case study: How developments in electronic sensors create destruction	005
	in the disposable nappy industry	205
	Chapter summary	210
	Discussion questions	210
	Key words and phrases	211
	References	211
	Further reading	213
	Taration roading	
	Managing arganizational knowledge	214
U	Managing organisational knowledge	217
	The Battle of Trafalgar	216
	Technology trajectories	217
	The acquisition of firm-specific knowledge	218
	The resource-based perspective	218
	Dynamic competence-based theory of the firm	219
	Developing firm-specific competencies	221
	Competencies and profits	222
	하는데 그들이 이렇게 되었다면 하는데	223
	Technology development and effort required	224
	The knowledge base of an organisation	225
	The whole can be more than the sum of the parts	226
	Organisational heritage When the performance of the organisation is greater than the abilities of individuals	226
	Observatoriains the knowledge base of the organisation	227
	Characterising the knowledge base of the organisation	in in I

Contents

The learning organisation	229
Innovation, competition and further innovation	229
Dominant design	230
How firms cope with radical and incremental innovation	232
Developing innovation strategies	235
Leader/offensive	236
Fast follower/defensive	236
Cost minimisation/imitative	237
Market segmentation specialist/traditional	238
A technology strategy provides a link between innovation strategy	
and business strategy	238
Case study: The cork industry, the wine industry and the need for closure	238
Chapter summary	247
Discussion questions	247
Key words and phrases	248
References	248
Further reading	250
8 Strategic alliances and networks	252
	202
Defining strategic alliances	254
The fall of the go-it-alone strategy and the rise of the octopus strategy	255
Complementary capabilities and embedded technologies	257
Interfirm knowledge-sharing routines	258
Forms of strategic alliance	258
Licensing	259
Supplier relations	259
Outsourcing	260
Joint venture	260
Collaboration (non-joint ventures) R&D consortia	262
Industry clusters	262
Low technology industry rely on networks for innovation	262
Innovation networks	263 263
The 'virtual company'	265
Motives for establishing an alliance	265
The process of forming a successful strategic alliance	266
Risks and limitations with strategic alliances	267
The role of trust in strategic alliances	269
The concept of trust	269
Innovation risks in strategic outsourcing	271
Eating you alive from the toes up	273
The use of game theory to analyse strategic alliances	274
Game theory and the prisoner's dilemma	274
Use of alliances in implementing technology strategy	276
Case study: Pizza delivery with unmanned drones	276

		Contents
	Chapter summary	281
	Discussion questions	282
	Key words and phrases	282
	References	282
	Further reading	285
	Tartic roading	
9	Research and development	286
	What is research and development?	288
	The traditional view of R&D	289
	R&D management and the industrial context	289
	R&D investment and company success	291
	Classifying R&D	293
	The operations that make up R&D	294
	R&D management and its link with business strategy	295
	Integration of R&D	296
	Strategic pressures on R&D	298
	The technology portfolio	298
	The difficulty of managing capital-intensive production plants in	
	a dynamic environment	300
	Which business to support and how?	300
	Skunk works	302
	Setting the R&D budget	303
	Evaluating R&D projects	305
	Evaluation criteria	305
	Case study: The long and difficult 13-year journey to the marketplace for Pfizer's Viagra	309
	TOTA TIEST O VIAGIA	
	Chapter summary	316
	Discussion questions	316
	Key words and phrases	317
	References	317
	Further reading	319
10	Open innovation and technology transfer	320
	Background	322
	The dominant economic perspective	323
	Open innovation	324
	The paradox of openness	326
	The acquisition of external technology	326
	Level of control of technology required	328
	Introduction to technology transfer	329
	Information transfer and knowledge transfer	329
	Models of technology transfer	331
	Licensing	331
	Science park model	332

Intermediary agei	ncy model
Directory model	
Knowledge Trans	sfer Partnership model
Ferret model	
Hiring skilled emp	ployees
Technology trans	sfer units
Research clubs	
European Space	Agency (ESA)
Consultancy	
Limitations and bar	riers to technology transfer
NIH syndrome	
Absorptive capacity	y: developing a receptive environment for technology transfer
	technology to internal capabilities
	rd transfer of technology
Technology trans	sfer and organisational learning
Case study: CSI an	nd genetic fingerprinting
Chapter summary	
Discussion question	ns
Key words and phra	ases
References	
Freethau vandina	
	New product development
Part Three N	dels
Part Three N Business mod What is a business	dels model?
Part Three N Business mod What is a business The business mode	dels model? el and the business plan
Part Three N Business mod What is a business The business mode The range of business	dels model? el and the business plan ess models
Part Three N Business mod What is a business The business mode The range of business	dels model? el and the business plan ess models ness model archetypes
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models	dels model? el and the business plan ess models ness model archetypes
Part Three N Business mod What is a business The business mode The range of busin The sixteen busin Revenue models Enterprise mode	dels model? el and the business plan ess models ness model archetypes
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models	dels model? el and the business plan ess models ness model archetypes
Part Three N Business mod What is a business The business mod The range of busin The sixteen busin Revenue models Enterprise mode Industry models	dels model? el and the business plan ess models ness model archetypes
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models Enterprise mode Industry models The parts of the business	dels model? el and the business plan ess models ness model archetypes sls usiness model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the business The offering	dels model? el and the business plan ess models ness model archetypes s els usiness model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models Enterprise mode Industry models The parts of the but The offering The customer sid	dels model? el and the business plan ess models ness model archetypes s els usiness model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the but The offering The customer sid The infrastructur The finances	dels model? el and the business plan ess models ness model archetypes s els usiness model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models Enterprise mode Industry models The parts of the busine The offering The customer sid The infrastructur The finances The business mode	dels model? el and the business plan ess models ness model archetypes s sls usiness model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the busine The offering The customer sid The infrastructur The finances The business mode Considerations in a Switching costs	dels model? el and the business plan ess models ness model archetypes s els usiness model de ee el dilemma of technology shifts
Part Three N Business mod What is a business The business mode The range of busine Revenue models Enterprise mode Industry models The parts of the busine The offering The customer sid The infrastructur The finances The business mode Considerations in a Switching costs Scalability	dels model? el and the business plan ess models ness model archetypes s els usiness model de ee el dilemma of technology shifts designing a business model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the but The offering The customer sid The infrastructur The finances The business mode Considerations in of Switching costs Scalability Recurring revenue	dels model? el and the business plan ess models ness model archetypes s els usiness model de ee el dilemma of technology shifts designing a business model
Part Three N Business mod What is a business The business mode The range of busine The sixteen busine Revenue models Enterprise mode Industry models The parts of the buth The offering The customer sid The infrastructur The finances The business mode Considerations in of Switching costs Scalability Recurring revenue Cashflow	dels model? el and the business plan ess models ness model archetypes s els usiness model de el dilemma of technology shifts designing a business model ues
Part Three N Business mod What is a business The business mod The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the but The offering The customer sid The infrastructur The finances The business mod Considerations in of Switching costs Scalability Recurring revenue Cashflow Getting others to	dels model? el and the business plan ess models ness model archetypes s els usiness model de el dilemma of technology shifts designing a business model ues o do the work
Part Three N Business mod What is a business The business mod The range of busine The sixteen busin Revenue models Enterprise mode Industry models The parts of the but The offering The customer sid The infrastructur The finances The business mod Considerations in of Switching costs Scalability Recurring revenue Cashflow Getting others to	dels model? el and the business plan ess models ness model archetypes s els usiness model de el dilemma of technology shifts designing a business model ues o do the work usiness from competitors

		Contents
	Intellectual property is an asset	373
	The technology licence and business relationships	374
	Continual adaptation of the business model	374
	The licensing business model	374
	Income from licensing	375
	Marketing issues related to the licensing model	375
	Financial and strategic implications	376
	Costs and benefits of the licensing model	376
	Other strategic uses of licensing	378
	Case study: Developing a new product for the teeth whitening market	379
	Chapter summary	385
	Discussion questions	385
	Key words and phrases	386
	References	386
	Further reading	387
12	Market adoption and technology diffusion	388
	Time lag between innovation and useable product	390
	Innovation and the market	390
	Innovation and market vision	391
	Analysing internet search data to help adoption and forecasting sales	391
	Innovative new products and consumption patterns	391
	Marketing insights to facilitate innovation	393
	Lead users	394
	Users as innovators in the virtual world	396
	Crowdsourcing for new product ideas	397
	Frugal innovation and ideas from everywhere	398
	Innovation diffusion theories	400
	Beacon products	402
	Seasonality in innovation diffusion	403
	The Bass Diffusion Model	404
	Adopting new products and embracing change	404
	Market adoption theories	406
	Case study: How three students built a business that could affect world trade	406
	Chapter summary	412
	Discussion questions	412
	Key words and phrases	413
	References	413
	Further reading	415
13	New product development	416
	Innovation management and NPD	418
	Product development as a series of decisions	420
	New products and prosperity	420
	Tion product and prooperty	/50
		655400000000000000000000000000000000000

	Considerations when developing an NPD strategy	421
	Ongoing corporate planning	421
	Ongoing market planning	422
	Ongoing technology management	422
	Opportunity analysis/serendipity	422
	NPD as a strategy for growth	422
	Market penetration	423
	Market development	423
	Product development	423
	Diversification	425
	A range of product development opportunities	425
	What is a new product?	426
	Defining a new product	428
	Classification of new products	429
	Repositioning and brand extensions	431
	New product development as an industry innovation cycle	433
	Overview of NPD theories	433
	The fuzzy front end	436
	Customer cocreation of new products	437
	Time to market	438
	Agile NPD	438
	Models of new product development	439
	Departmental-stage models	439
	Activity-stage models and concurrent engineering	441
	Cross-functional models (teams)	441
	Decision-stage models	442
	Conversion-process models	443
	Response models	443
	Network models	443
	Case study: Umbrella wars: GustBuster® and senz°	444
	Case study. Offibrella wars. Gustbuster and seriz	444
	Chapter summary	447
	Discussion questions	448
	Key words and phrases	448
	References	449
	Further reading	451
1	Modest assessed and the before as a second and	
U 4	Market research and its influence on new product	
	development	454
	Market research and new product development	456
		450
	The purpose of new product testing	
	Testing new products	458
	Techniques used in consumer testing of new products	459
	Concept tests	459 460
	Test centres	460
	Hall tests/mobile shops Product-use tests	460
		460
	Trade shows	460

		Contents
	Monadic tests	461
	Paired comparisons	461
	In-home placement tests	461
	Test panels	461
	When market research has too much influence	461
	Discontinuous new products	464
	Market research and discontinuous new products	465
	Circumstances when market research may hinder the development	
	of discontinuous new products	466
	Technology-intensive products	467
	Breaking with convention and winning new markets	468
	When it may be correct to ignore your customers	472
	Striking the balance between new technology and market research	473
	Using suppliers and lead users to improve product variety	474
	The challenge for senior management	475
		475
	Case study: Dyson, Hoover and the bagless vacuum cleaner	
	Chapter summary	484
	Discussion questions	485
	Key words and phrases	485
	References	485
	Further reading	487
A	Managing the new product development process	488
19	Managing the new product development process	400
	New products as projects	490
	The Valley of Death	491
	The key activities that need to be managed	492
	Assembling knowledge	494
	The generation of business opportunities	495
	Developing product concepts: turning business opportunities into	
	product concepts	496
	The screening of business opportunities	497
	New technology product blogs	499
	Development of product prototypes	499
	Technical testing	501
	Market testing and consumer research	501
	How virtual worlds can help real-world innovations	502
	Market introduction	503
	NPD across different industries	505
	Organisational structures and cross-functional teams	506
	Teams and project management	506
	Functional structures	506
	Matrix structures	507
	Corporate venturing	509
	Project management	509
	Reducing product development times through computer-aided design	510
	The marketing/R&D interface	510
	High attrition rate of new products	51